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Czech J. Food Sci.

Manjunatha S.S., Raju P.S., Bawa A.S.:

Modelling the rheological behaviour of enzyme clarified

lime (*Citrus aurantifolia* L.) juice concentrate

Czech J. Food Sci., 30 (2012): 456-466

The rheological behaviour of enzyme clarified Lime (*Citrus aurontifolia* L.) juice was studied as a function of the total soluble solid (TSS) content (7.3 – 55.7 ° Brix), corresponding water activity (a_w) (0.985 – 0.831) at different temperatures (20 – 80oC) using co-axial controlled stress rheometer. The rheological parameter shear stress was measured up to the shear rate of 600 s – 1. The investigation showed that the enzyme clarified lime juice and its concentrate behaved like a Newtonian fluid with the viscosity (η) being in the range 3.964 to 50.290 mPa s depending upon the concentration and temperature used. The temperature dependency on the viscosity of lime juice was described by Arrhenius equation (r > 0.99) and the activation energy (E_a) of viscous flow was in the range 4.151 to 26.050 kJ/mol depending upon the total soluble solids content. The effect of total soluble solid content on the flow activation energy was described by

exponential type equation (r > 0.98) and that of water activity was described by both the power law and exponential equations (r > 0.99). The effect of total soluble solid content on the viscosity of lime juice followed the second order exponential equation (r > 0.99) at the temperature used. The effect of water activity on the viscosity was described by both the power law and exponential type relationship (r > 0.97). The equations relating to the combined effect of temperature and total soluble solids content/water activity on the viscosity of enzyme clarified lime juice were established.

Keywords:

combined effect; power law model; exponential model; rheology; viscosity; Arrhenius equation; activation energy

[fulltext]